Analysis of Spatial and Temporal Variability of the Warm Season Land Surface Energy Budget Using a GOES Assimilation Technique and Surface Flux Sites

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ABSTRACT

The fundamental goal of this project is to perform a complete evaluation of the surface energy budget over the Mississippi River basin produced by assimilating GOES-derived land surface products (land surface temperature tendencies, surface insolation, and albedo) into a mesoscale model without a priori knowledge of land surface characteristics (i.e., vegetative resistances, green vegetation fraction, leaf area index, soil physical and hydraulic characteristics, and the vertical distribution of soil moisture). The spatial and temporal realism of these data will be critiqued through intercomparisons with: 1) In-situ observations; 2) Products from the NOAA/NCEP (National Centers for Environmental Prediction) Eta model system, and; 3) Two independent estimates of the surface energy budget obtained from an inversion procedure using remote multispectral measurements from NOAA/AVHRR (Advanced Very High Resolution Radiometer), and a functional landuse classification parameter termed the Thermal Response Number.

OBJECTIVES

1. Produce three independent estimates of the surface energy budget during the Spring and Summer seasons of 1997 and 1998 over the eastern two thirds of the continental United States at a horizontal scale comparable to that for the operational Eta model (~48 km).

2. Use available flux sites in the LSA-SW, LSA-NC, and LSA-E regions to assess the realism of the seasonal variability of these estimates.

3. Use observations of surface meteorology and proxies for vegetation and soil moisture to evaluate the spatial variability of these independent flux estimates on a continental scale.

4. Apply the techniques on a fine length scale (~1 km) by using aircraft data collected during SGP97.